INDOOR HEALTH PROBLEMS: A SOUND PROCESS FOR RESOLUTION

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Media and public attention to indoor health has grown exponentially over the past few years. Every day, one finds a news item about suspected adverse health threats due to conditions in a commercial or municipal building. Alleged culprits change over time from bioaerosols (i.e., bacteria and mold), to formaldehyde, to toxic carpets and, now, back to bioaerosols. The public is fearful that even the smallest sign of mold in homes or the workplace will lead to a diverse range of major health problems including brain damage. Stories on 48 Hours, ABC News, the Discovery Channel, the Internet, and in USA Today have all contributed to that popular mindset.

Building complaints most often begin with occupants concerns about workplace comfort levels. One or more individuals complain to an office manager, supervisor or facility manager that the space is too hot, too cold, too dry. Often if an individual perceives that there is inadequate attention to these grievances, then more specific allegations of health problems emerge – headaches, dry and irritated eyes, cough, irritated throat and lungs, shortness of breath, fatigue, etc. Unfortunately, the first reaction of those responsible for building comfort generally is to call the HVAC contractor to fix the air quality problem. Yet, the most important course of action is to determine what the underlying causes of the complaints actually are and secondarily, whether building environmental conditions are responsible.

Addressing these complaints is complicated by the fact that there are a number of causes for such non-specific symptoms. They could be a signal of a medical problem unrelated to the building conditions. The complaints may originate from psychological or emotional factors associated with job stress or family concerns. They could be related to the physical environment of the building. While each of these potential causes is equally important, the underlying potential causes can only be investigated by experienced medical professionals, not facility managers, engineers or the occupants themselves. Only in situations in which complaints are clearly related to the environment – temperature and humidity primarily – are engineering fixes warranted.

Often the person to whom the complaints are made accepts the occupants view that the symptoms reported are related to the indoor air. However, the broader the range of symptoms or complaints, the less likely it is that the building environment or indoor air is responsible. Table 1 illustrates the diversity of symptoms, common medical causes, and possible building-related causes. Management of perceived indoor health issues is half technical and half public relations. If these two traits can be identified within the building management staff, then such a person would be an appropriate problem manager. If not, then owners and managers would be best served to find a consultant who can assist in both areas.

INVESTIGATING HEALTH COMPLAINTS

The bottom line of any investigation is to make the workers feel more comfortable – to remove their symptoms as quickly as possible. Three levels of investigation can be launched. The choice of any one will depend upon the results of the initial evaluation of the potential causes of the symptoms.

Level 1. At its simplest, an indoor air investigation involves an uncomplicated inspection and minimal corrections. It may involve minor cleaning of the HVAC system and/or adjustments to air flow, temperature or humidity. Cleaning visible evidence of mold and adjusting humidity within the building may be a sufficient solution.

Level 2. This next level requires more intensive analysis. The quantity and diversity of health complaints may suggest a more serious problem. A team of consultants that includes physicians/toxicologists, industrial hygienists and engineers may be necessary to solve a complex problem of diverse health complaints.

Level 3. This level represents the most intensive investigation. As in Level 2, a team of qualified professionals in engineering, industrial hygiene and medicine are required. A comprehensive environmental sampling and laboratory analysis may be necessary in order to effectively and efficiently determine the source of the problem and an effective resolution.

REACHING COST-EFFECTIVE REMEDIATION

The suspected presence of mold and potentially hazardous chemicals in building environments is and will continue to be a major source of worker discontent, lost productivity, expensive testing and remediation, and litigation in the coming years. The facility management industry likely will experience unnecessarily high costs associated with resolving occupants complaints about health problems, whether real or perceived. How can major delays and high costs too often observed in indoor health problems be averted? Three critical recommendations come to mind.

Select a consultant with care

Regretfully, the growth of "experts" in this current climate of "problem buildings" has been exponential. Yet, the credentials and scientific expertise of many are lacking.

Therefore, a careful review should be made when selecting a qualified consultant. Questions to ask include:

- What scientific background does a consultant have? A combination of expertise is needed to make credible recommendations – physician/toxicologist, industrial hygienist, and engineer. If this combination of expertise is not brought to bear on an indoor health problem, the investigation actually may become an expensive research study for the consultant, paid for by the building owner or manager. The recommendations made by less qualified personnel could be more targeted to "getting as much information as possible" rather than at identifying the actual cause of the complaints and extent of remediation that may be necessary to address the cause.

- Is the consultant associated with adjunct aspects of the remediation process? It is important to know whether a consultant also owns or is involved with an analytical laboratory. If so, then recommendations about the quantity and diversity of sampling and analysis could be suspect. Additionally, one should be wary of a consultant who has even an indirect association with a remediation firm. As noted by one building inspector – "While moldy buildings may be a major headache for the building owner, they are a godsend for the remediator who fixes them. The profit margins are higher."

- Are the remediation goals of the consultant and the owner the same? If major issues of concern are not carefully identified at the start of the project, confusion and conflict can develop at a later stage. The owner/manager may be concerned about potential health threats posed to current or future occupants. Yet, the consultant, because of his experience and background, may actually have a non-health approach to the problem. It is critical that the focus of the problem be clearly identified at the onset of the search for a solution and that both the owner and a consultant are in full agreement about this focus. Part of this agreement must include an up-front discussion about "how clean is clean." When is the cleanup complete?

- Does the consultant have litigation experience? Too often a consultant will rush to find a solution without considering long-term ramifications of the process chosen. By not understanding health litigation issues, a consultant can inadvertently provide future plaintiffs with ammunition, simply by the way the problem is characterized, by the extent of sampling conducted, by the manner in which the remediation solution is validated (or not) in a final report, and by the connections (often incorrect) that environmental testing groups catalogue as potential health effects.

Verify a potential for health hazards

Too often, a building manager will observe the presence of mold or immediately assume that health complaints from occupants reflect a real building-related health problem. The result of such an assumption is the initiation of a complex process to find a "cause -- any cause" and remediate to pristine conditions (generally an impossible goal). However, the first priority for a building manager should be a verification of the health complaints by a qualified physician/toxicologist – someone who can listen to the health complaints, rule out alternative causes (e.g., job stress, unrelated medical problems) and document the health effects known to be associated with environmental conditions in the building.

Before a remediation plan is developed, it is necessary to determine that the visible presence of mold is in an area that could pose a health problem and is of a type and concentration known to be associated with a health problem. Finding some mold in a crawlspace or detecting water damage in wall insulation may require correction of the water incursion and a focused remediation. However, there is no reason to assume that a health issue exists, if the location of a mold is inaccessible to human contact. Unfortunately, some consultants resort to scare tactics suggesting that "toxins from the mold and fungi are human poisons" regardless of their location (e.g., in wall insulation), or that the presence of mold and fungi will result in brain damage. There is no scientific or medical evidence to support either claim.

Identify scientifically validated and practical solutions

Before settling upon a particular remediation plan, it is necessary to verify that the proposed solution is practical and valid. Innovative and creative solutions may be attractive to a remediation company, but might do little to actually resolve the problem. For example, a $250,000 remediation plan in an elementary school called for "blasting mold-encrusted but structurally sound wooden framework with dry ice." The process was "believed" by the remediation firm to kill the molds and fungi; yet no studies had been conducted to validate it as a viable and effective solution. If the cause of the mold and fungi growth has not been identified, i.e., source of high humidity or water-damage. Thus, the use of such a costly and 'creative' solution is a short-term fix at best.

Although it may sound like common-sense, finding the actual source of the problem is critical for a long-term solution, and an issue often ignored by the consultants and remediation firms. The majority of mold problems that we and our colleagues have encountered usually resulted from faulty water management, either associated with ventilation and humidity conditions of the HVAC system or faulty resolution of water or soil intrusion into a building. If these types of causes are not addressed, the mold/fungi removal will be short-term.

SUMMARY

Responding to health complaints from building occupants can be a complex endeavor for a facility manager. It requires technical expertise in medicine, industrial hygiene, and engineering. It also requires the ability to communicate effectively with those voicing the complaints. By selecting a consulting team with care, verifying a potential for real health hazards in the building, and identifying scientifically sound and practical solutions, resolution of these problems can be straightforward, more satisfying to occupants and less expensive than commonly occurs today.

Table 1. Potential Causes of Building Occupants' Health Complaints

Health Symptom	*Medical Causes*	*Building Causes*
Headache	job or family stress eye strain sinusitis history of migraine neck strain	inadequate lighting chemicals
Skin rash	insect bite eczema contact dermatitis	fiberglass
Itchy eyes	contact lens allergies infection	low humidity mold chemicals dust fiberglass
Nosebleeds	allergies infection trauma	low humidity
Fatigue	serious disease, e.g. cancer depression lack of sleep job or family stress	chemicals-possible, but rare

Miscarriages	cause often unknown personal activity genetic factors infection metabolic imbalances	none known